HOSPITAL PATIENT DATABASE MANAGEMENT SYSTEM

A Case Study of General Hospital NORTH-BANK Makurdi- Nigeria

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Abstract: Health care in Nigeria as in many other countries is confronted with growing demand for medical treatment and services. The medical records must appropriately have all of the patients' medical history. Physicians must maintain flawless records, because this document serves a number of purposes. This study on hospital patient datable management system was design to transform the manual way of searching, sorting, keeping and accessing patient medical information (files) into electronic medical record (EMR) in order to solve the problem associate with manual method. The existing system (manual) has been studied and hence a computer based application was provided to replace this manual method. These computer based systems generate the patient report as the patient register in and out of the hospital. This paper generally looks for a more accurate, reliable and efficient method of computer to facilitate patient record's keeping in General Hospitals to ensure efficient outcome that will lessen time consuming. The study proposed that the design of hospital patient database record will be a solution to the problem being experienced by the current manual method of keeping patient medical record.

Keywords: Data; Database; Patient; Hospital; Medical Record; Electronic Medical Record

I. INTRODUCTION

In the present era of globalization and advanced technology efficient record keeping cannot be overemphasized. Imagine the scenario when the manual processes and manual modes of instruction get replaced with electronic systems. One of such replacement can be done in the area of patient's database management system within a hospital. Developing patient database management system software would benefit the hospital management who can have effortless access to the data securely and more easily. Libraries keeps information on how many books are in the library, how many are been loaned out and to whom they are loaned and also the date and time this books were loaned or given out. School also keeps student's information or records. These records of students could include student's personal data such as name, sex, date of birth, level etc.

Hospitals are not excluded in record keeping. The records kept include patient data, which help to maintain patient's medical records. The medical records must have correctly all of the patient medical history. Physicians must maintain flawless records, because this document serves a number of purposes. It serves as a communication tool. As an

important source of patient information, the medical record facilitates the transfer of data to other physician involved in an ongoing treatment of patient or the transfer of patient to another physician outside the office of the attending physician. It also facilitates the transfer of data to health care establishment or to any other organization or individual such as insurance company or employer. Well-kept records usually reflect the level of care given to a patient by the physician. Therefore medical records can be used as an evaluation tool. The more complete the record, the better they will serve the physician and the patient in the event of any action. Every patient's medical record must include the following specific information. Patient's identity which includes the patient's first name, last name, sex, age, address, etc.

II. STATEMENT OF PROBLEM

In spite of the important function of medical record, it has come under severe threat that by the manual system of medical record keeping. This system involves taking down patient data on pieces of papers, which are then put in to the files and filed in cabinets.

Another problem is the missing of pieces of information. One standard hospital study reveals that on the average, patient records visited, there are pieces of information the doctor could not find in the paper file.

Physicians and their office staffs have said that, they spent more time looking for patient information, than the time they have for the patient, as issues related to risk management is security. The first consideration is the physical safety of the data being stored. Threats exist externally in the form of natural disasters. The most important issue is the security involved in patient's privacy.

Definition of Basic Terms

Data: A collection of fact on which conclusions maybe drawn.

Hospital: An institution that provides medical, surgical or psychiatric care and treatment for the sick or the injured.

Patient: One who receives medical treatment attention care.

Medical records: It's any data, which is collected and use to diagnose or treat a patient's health problem.

Database: A collection of data arranged for ease and speedy search and retrieve.

III. LITERATURE REVIEW

Health care in Nigeria as in many other countries is confronted with growing demand for medical treatment and services, [1] due to factors such as a graying population and higher standard for the quality of life. Miller [2], say that health care has been an issue of growing importance for national government. Many national and regional health care plans have been developed in the past decades, in order to control the cost, quality and the availability of health care for all citizens.

Brown [3], opined that the application of electronic clinical information system (ECIS) has generated useful insight into the quality of data accuracy and health care provision in primary care settings. This is partly one of the adapted style and approach to data entry influenced by the design presented by the recent structure. They further emphasize, that there is a great need for improved education and protocols for consisting data entry in the (ECIS) and also subsequent follow up of patient clarification on the policy for duration and frequency treatment.

Laubbel [4], define medical, health record, or medical documentation of a patient's medical history and care as "medical record" used both as the physical folder of patients and for the body of information which comprises the total of each patient's health history. Medical records are intensely personal document and there are many ethical and legal issues surrounding them such as the degree of third-party access and appropriate storage and disposal. The key advantage of shifting to computer-based patient record is the opportunity to strengthen the link between the hospital records and management information system so that resources uses and quality of care can be analyzed using Hospital database which increase physician efficiency and reduce costs, as well as promote standardization of care.

IV. OVERVIEW OF PAPER-BASED PATIENT MEDICAL RECORD

Most of the patient and administrative information that flow throughout the health care system is still recorded on paper. According to an earlier report by cnnmoney.com, only about 8% of the nation 5,000 Hospital and 17% its 800,000 physician currently use the kind of common computerized record keeping system.   Philadelphia (May 1, 2009) medicine part B spending on Imaging rose from $6.80 billion in 2000 to $ 14.11 billion in 2006 (web page, Wikipedia "Advantage of electronic medical records").
In general, medical records may be on physical media such as film (X-rays), paper (note) photographs, often of different sizes and shapes, physical storage of documents in problematic as not all document types fit in the same size folder or storage spaces. In the current global medical

environments, patient are shopping for their procedures many international patients travel from one country to the other for special treatment or to participate in clinical trial co-ordination these appointment via paper-based record is a time consuming procedure. Physical records usually requires significant amount of space to store to them, when physical records are no longer maintained, the large amount of storage space are no longer required paper film and other expensive physical media usage can be reduce by electronic record storage. Paper records are stored in different location, furthermore, collecting and transporting them to a single location for review by a health care provider is time consuming. Also when paper records are required in multiple location, copying, faxing and transporting cost are significant.

In 2004, an estimate was made that 1 in 7 hospitalizations occurred when medical records were not available. Additionally, 1 in 5 lab-tests were repeated because results were not available at the point of care. All these were as a result of paper-based medical records.

Hand written paper medical records can be associated with poor legibility, which can contribute to medical errors.

Paper-based patient record hinder flow according to [5] once information has been recorded within a set of bulky paper records, it may not be readily accessible later, effort to compile more complete paper records are likely to make this problem worse. Paper records can only be use in one place at a time.

The data are only as secure as the paper itself and the entire records are individual page within a record can easily be misplace, damage lost or stolen.

This research work focus on how this method can be improved through the automation of patient database system which convert the paper based patient medical record to computer-based paper-based.

V. REVIEW OF COMPUTER-BASED PATIENT RECORD

Laing [6], suggested that if all information in paper-based records were digitized and embedded within information system, that will provide rapid context sensitive access to the data and link to other information in the institution. The health care delivery could fully documented information using a variety of convectional and handheld computers equipment with keyboard, pen-based. Structured data entry or handwriting recognition illegible or consistent entries could be caught and corrected as they are entered in medical order, their results and all others internal transactions could be tracked automatically.

Though, [6], have made a significant contribution toward the development of a computerize medical records for medical institutions, however this project intends to look at how medical record of a hospital would be share only within the hospital by the staff and not across the institution.

Health information could be stored as individual indexed items of information that could be abstracted into reports and compare among patients. Record could be accessed and easily duplicated when necessary. Information anywhere within the record could be access by minimal delay. Data could be located from any one delivery medium and digital device that access them could be designed with a wide variety of capability and capacity [7]. A page from a paper-base patient record could be stored electronically in many different ways. The information could be scanned and store as an image (much like a fax) that is the picture of a paper form but is not searchable or editable document imaging system are widely available that use computer and optical disk to store such image and make them available to clinicians on workstation with graphic terminals. These system reduces the amount of physical storage space require for patient record and they allow the record to be shared by clinicians and administrative officers without physically transporting the records.

Handwritten medical record can be associated with poor legibility which can contribute to medical error, pre-printed firms, the standardization of abbreviation and standard for penmanship were encouraged to improve reliability of paper medical records. Electronic record help with the standardization of forms terminology and abbreviation and data input. Digitization of form facilitates the collection of data for epidemiology and clinical studies. Duplication of lab tests, diagnostic imaging, and other services can be prevented by good record-keeping of any type. However, because database records can be available at many locations at once, integration of services and awareness of duplication can be reduced. Database management system enable health organization to access old records instantly, thereby allowing the health work to send to another health organization in the event of an emergency.

VI. THE NEED FOR COMPUTERIZED PATIENT MEDICAL RECORD

Tumba [8], developed a database for drugs that improved the effectiveness and efficiency to eliminate drugs wastage through over stocking or expiring of drugs following a stock of inventory of Hyelada pharmaceutical. They intend to develop not only a database for drug but a computerized medical record that would encompass other related records of patients within the health care institution.

According to [9] cited by [8], to enhance the work of medical practitioners in hospital/clinics it is widely recognized that information system is essential for managers, because most organization need information system for help companies extend their reach too far away location often new product and services reshape job and work flow and perhaps profoundly change the way they conduct business. Laboratory information system (LIS) is one of the integrated parts of information system which involve many different applications. Use of a LIS is a critical piece of a clinical information technology spectrum of system which contributed significantly to the overall care given to patients.

Fielde [10], stated that transformation of medical practices is emerging not only as a result of the availability of these technology but as a deliberate attempt to address the image challenges facing the health care delivery. According to [11], an Electronic Health Record (EHR) refers to an individual patient's medical record in digital format. Electronic health record system co-ordinate the storage and retrieval of individual record with aid of computer.

VII. COMPUTER MANAGEMENT STYLE

By alignment of impact information technology (IT) [12], say that a hospital that moves from a level to another shows the changes in management information technology (MIT) in hospital management. Alignments start from the existing business organization and its needs, generating the supporting IT services. Impacts start from IT opportunities and generate changes to the overall business plan and the hospital processes. In that way, the software can be used to follow the developments in hospital overtime; obviously the program can be used to compare several operation of the hospital at a given moment.

VIII. RECORD AND METHOD/PROCEDURE

Patient's record and procedure vary greatly according to patient data received and the extension of automation in processing data.

These are some fundamental step which is common to patient record in all clinics and hospitals. According to [13], some of these steps taken at each treatment of patient and assessment in clinical procedure include:

- Assessment: To get the information and the assessment of patient's symptom and signs.
- Data entry: recording of data into a patient's record (which may be a complex electronic data written records results etc)
- Data retrieval: extracting data for interpretation.
- Information interpretation: governance of interpretation of individual patient data

utilization of existing knowledge and guidelines. Therefore, when these fields are put together they produce a medical record.

IX. THE OLD SYSTEM

The procedure involved in the current system is that, when a patient visit the hospital for medication, the patient will first of all buy the identification card which contains name, and other relevant information needed, and card identification number. The patient will then waits for the card to be processed together with a file jacket that holds the card that has column for diagnosis made by physician, drugs prescribed, and date at the waiting room for the arrival of the card.

When the file arrived, the patient joints the queue to see a doctor. In this current system, file cabinets are used for keeping individual patient card enclosed in a file. This system is so tedious in tracing a record files slow in processing of records, space occupied by the file time waiting while waiting for the patient file to be retrieve by the receptionist.

X. THE NEW SYSTEM

This new system is design for medical practitioner/physician to keep track of all patient's medical record/information such as diagnosis, drug prescribed, admission and discharged, etc the new system will take care of the long processes and tedium work involved in tracing and retrieving a patient's record in the old system in a nut shell this will improve the efficiency of the management in a daily work as it can provide required records on time.

System Specification

For maximum and effective execution of the task by the system, there are the hardware and software requirement.

Hardware requirement

- System unit
- Monitor (VDU)
- Uninterrupted power supply (UPS)
- RAM (64)
- CD Rom
- Hard disk capacity of 40GB
- Printer

Software Requirement

- Window XP operating system
- Microsoft access
- Microsoft visual basic

Programming Language

The programming language to be use in designing the program is Microsoft visual basic MS, access 6.0

Visual basic programming: is a programming language environment that are specially designed for creation of other programs, which is an object oriented programming (OOP) and event driven,(user don't control and determine the sequence of execution, but user will just press keys and click on various button and boxes in the window). In visual basic, we work with object (things), properties (which tell something about the object), and method (action associated with object). Therefore a visual basic program is made up of many subprograms, each has own program codes, and can be executed independently and at the same time each can linked together in one way or the other. The programming language are window basic program contain tools to make programming for windows easy, code is compiled, therefore the compiled code runs quick, keeping simple organized and protected, arranging component or control on a form using drag and drop techniques. Visual basic is user friendly.

XI. SYSTEM DESIGN

According to [14], system design is the process of art of defining the architecture, component, modules, interface, and for system to satisfy specified requirement. Architecture desire creates a blue-print for the design with necessary specification for the hardware, software; people and data resources. In many cases multiple architectures are evaluated before one selected. The research question such as what is currently being done, how is it being done. How well is the task being perform.

The analysts gather details about the business (medical record) process and try to improve on them.

In order to enter information into an electronic medical record, special software is required. In designing the program with Microsoft visual basic the design will include the following.

    i.   Use case diagram
    ii.   Database design and
    iii. Normalization

Database Design

Database: is a collection of structure and related record (information) stored somewhere or some location for easy retrieval and exploration. Database is designed in order to assist in eliminating unnecessary data and to minimize duplication of data.(see Appendix)

Database Normalization

Normalization is the organization of data to conform to a standard called Normal form and for efficient manipulation, storage and update of data. (See Appendix)

Database Implementation

The database of this application was implemented in Microsoft office Access. MS-Access is database application with which one can create database files using the relational model. With this model you can create tables, store and manipulate data within the tables as required. Relationship can also be established to create communication among them.

XII. CONCLUSION

This study embarked on the patient medical information which substitutes the current (manual system) of sorting, handling, searching, amending and keeping of patient medical records. This portrays the importance and indispensable nature of the computer and its application in the hospital. The database aimed at reducing paper work in the reception area to reduce the time wasted by patients in the course of waiting for their files to be retrieved. This also reduced the spaced occupied by the files and provide adequate security for patient s medical record. Based on the finding of this study, the design of hospital patient database record will be a solution to the problem being experienced by the current manual method of keeping patient medical records. The study has critically indentified the importance associate with using electronic in keeping patient medical record to eliminate missing files and enhance speedy retrieval of patient's record. The management of General Hospital North Bank (Makurdi) has agreed that the manual method of keeping patient records should be change to computerized patient medical records which will help them to eliminate inefficiency, and unreliability associated with the manual method. Through the exhausted study and analysis made in this research, it was recommend that General hospital Makurdi and other medical centre that had been providing health care service should have an automated system for effective operations.

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.**[3] Monday, G.** receives his Bachelor's Degree in Maths/Economics from MAUTECH, Yola Adamawa State Nigeria. gojimonday@gmail.com +2348068260197.
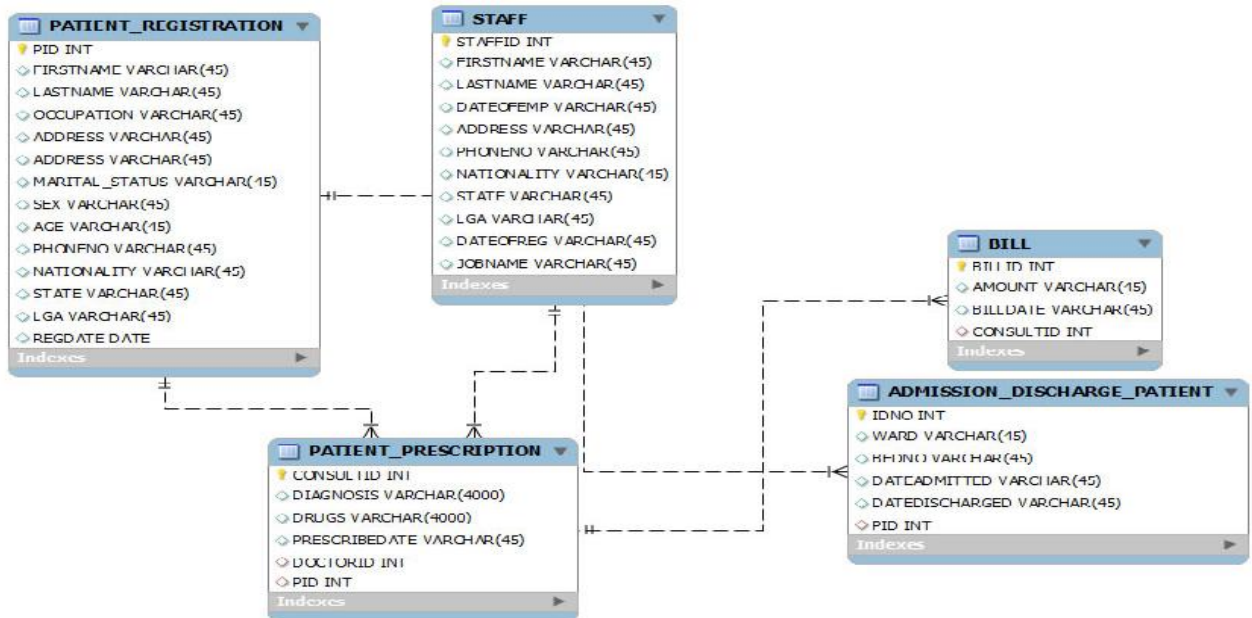
APPENDIX

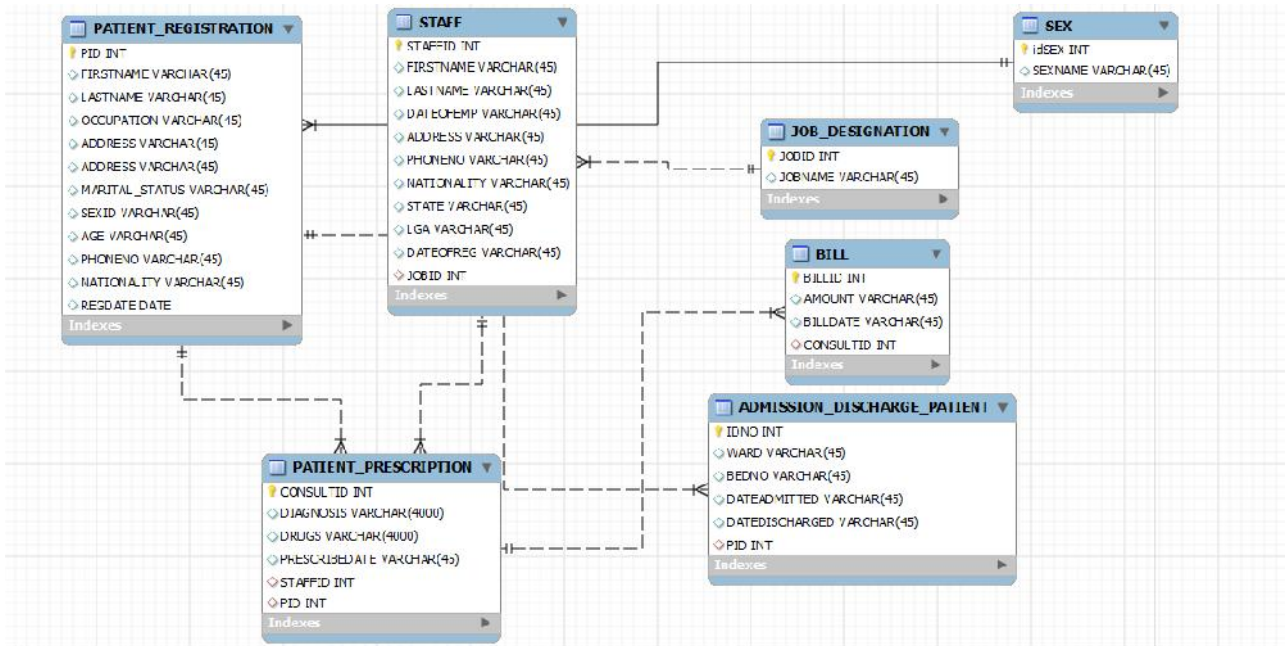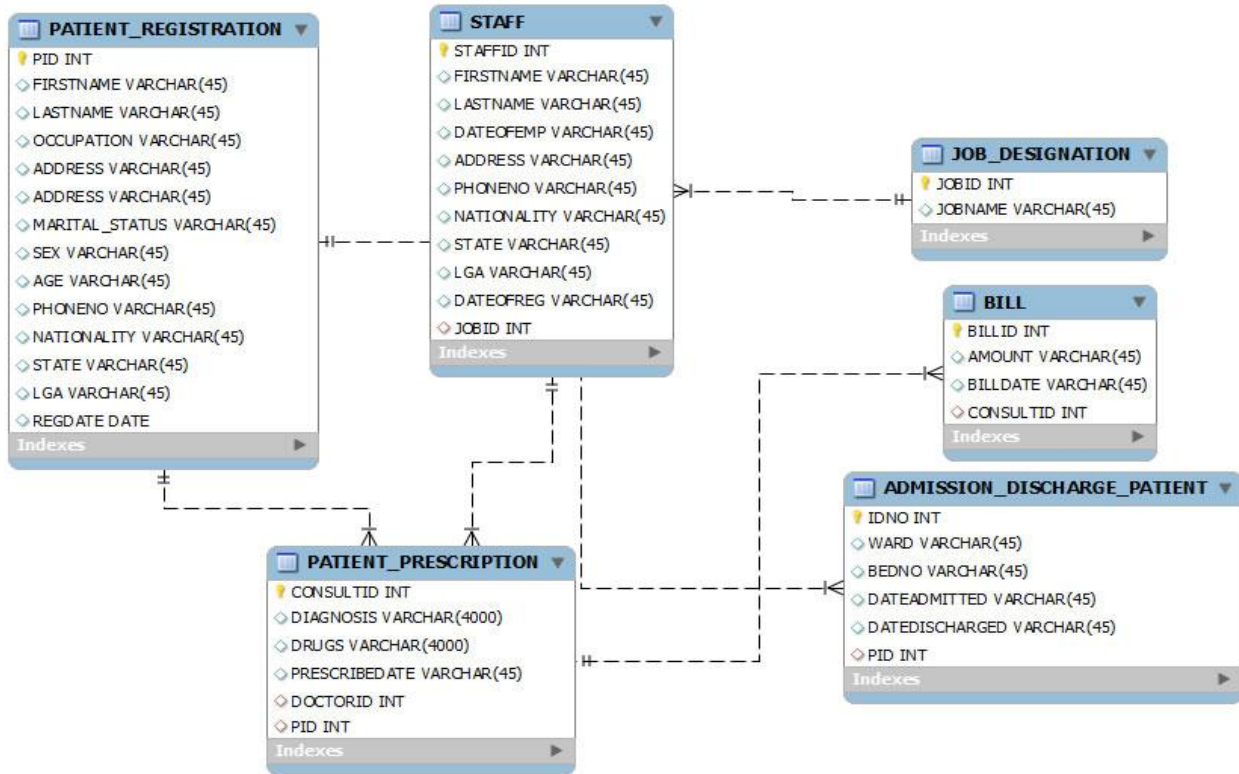**Fig. 1: NORMASLISATION FORM ONE (1NF)**

Fig 2: SECOND NORMALISATION FORM TWO (2NF)

Fig 3: THIRD NORMALISATION FORM THREE (3NF)